UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,061	10/10/2003	Reed Roeder Corderman	124833-1	3241

6147 7590 12/19/2005

GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER	
LAVILLA, MICHAEL E	

ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 12/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/684,061	CORDERMAN ET AL.	
	Examiner	Art Unit	
	Michael La Villa	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20050324; 20031010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 33 is objected to because of the following informalities: In Claim 33, last line, the word "spraying" is misspelled. Appropriate correction is required.

Double Patenting

2. Claim 28 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 27. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).
3. Claims 27 and 28 claim the same collective thickness parameters, and so it is unclear how they cover different content.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

5. The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-45 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

   I. Regarding Claims 1, 12, and 22, it is unclear what is meant by the term "nano scale." This term has not been defined in the Specification, and it is unclear what is a generally accepted meaning for this term. Does it refer to "sub micron"? Is it any thickness less than 1 micron? Less

than 500 nm? Are angstrom sizes encompassed? Would an atomic layer be encompassed? It is unclear what are the metes and bounds of the claimed "metallic alloy layers." Must these layers be only comprised of metallic elements? Must they at least be comprised of two metallic elements? Can nonmetal elements be present in a significant proportion? Is there another applicable definition?

II. Regarding Claims 22, 31, 33, 35, 36, 38, and 40, it is unclear what structural arrangement is required by the limitation of "adjacent to the surface of the substrate." Does this mean "disposed on"? Does this language allow for an intervening layer between the substrate surface and the plurality of metallic alloy layers and ceramic oxide layers? Does this language preclude such an intervening layer?

III. Regarding Claims 1, 12, 22, 36, 38, and 40, it is unclear what structure is required by the claimed "alternating manner." Does this refer only to alternating metallic alloy layers with ceramic oxide layers? Must each metallic alloy layer be separated from other metallic alloy layers by exactly one ceramic oxide layer?

IV. Regarding Claim 42, it is unclear what is meant by the phrase "at a predetermined temperature." It is unclear whether this limitation in this claim is superfluous. Were this language deleted, would the scope of the claimed subject matter be affected? How? If not, it is unclear how this language is further limiting.

V. Regarding Claim 45, it is unclear what is meant by the phrase "about 80% of the melting temperature of the nano-multilayered structure." It is unclear whether this melting temperature refers to the melting temperature before heat treatment has been performed? It is unclear how applicant determines the melting point of a structured material comprised of materials having varying melting temperatures. Is this the melting point of the first material to melt? Does the requirement imply that the designed structure is selected of materials to have a single melting point? It is unclear what is the temperature scale against which the eighty percent is to be assessed? Is this Kelvin temperature scale? If not, what is meant by 80% of 500 degrees centigrade, for example? What temperature corresponds to this?

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

8. A person shall be entitled to a patent unless –

9. (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 1, 4, 6, 8, 9, 12, 15, 17, 19, 22, 25, 29, 31, 32, 36, 37, 42, and 45 are rejected under 35 U.S.C. 102(e) as being anticipated by Fukui et al. USPA 2004/0018393. Fukui et al. teaches a coated tool implement having a plurality of alternating TiSiCNO and CrCNO layers, where the TiSiCNO layer can be identified with the claimed metal alloy layer and the CrCNO layer can be identified with the claimed ceramic oxide layer. The collective thickness is 3 microns. The layers are deposited by arc vapor deposition, a PVD technique. See Fukui (Figure 1; paragraphs 18, 27-33, and 54; and Table 1, particularly entry 1-8).

12. Claims 1, 3-9, 12, 14-19, 22, 24-29, 31, 32, 36, 37, and 42-45 are rejected under 35 U.S.C. 102(b) as being anticipated by Strondl et al. USPN 6,333,099. Strondl et al. teaches a coated tool implement having a plurality of alternating TiAlN and alumina layers, where the TiAlN layer can be identified with the claimed metal alloy layer and the alumina layer can be identified with the claimed ceramic oxide layer. The individual layer thickness may be 20 nm. The collective thickness may be 6 microns. The layers are deposited by sputtering, while heat treating at 650^{o}C. Strondl also suggests applying layers by CVD. See Strondl (col. 3, line 25 through col. 4, line 56).

13. Claims 1, 3, 4-12, 14-22, 24-32, 36, 37, 41, 42, and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Mullin USPN 5,687,679. Mullin teaches a coated gas turbine nickel superalloy part having a plurality of alternating layers of zirconia stabilized with yttria and layers of alumina. Layers of zirconia stabilized

with yttria may be identified with the claimed metal alloy layer as the layer is comprised of compound that includes zirconium and yttrium. Alumina is an oxide ceramic. The individual layer thicknesses are about 100 nm, and the collective layer thickness is about 5 microns. As exemplified, the layers are deposited by PVD techniques. See Mullin (col. 2, line 43 through col. 3, line 3; col. 4, lines 5-21 and 42-64; col. 5, lines 4-29; and col. 6, lines 31-61).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. Claims 33-35 and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mullin USPN 5,687,679. Mullin teaches a coated gas turbine nickel superalloy part having a plurality of alternating layers of zirconia stabilized with yttria and layers of alumina. Layers of zirconia stabilized with yttria may be

identified with the claimed metal alloy layer as the layer is comprised of compound that includes zirconium and yttrium. Alumina is an oxide ceramic. The individual layer thicknesses are about 100 nm, and the collective layer thickness is about 5 microns. As exemplified, the layers are deposited by PVD techniques. See Mullin (col. 2, line 43 through col. 3, line 3; col. 4, lines 5-21 and 42-64; col. 5, lines 4-29; and col. 6, lines 31-61). Mullin does not exemplify layer deposition by CVD or thermal spraying, but does suggest that conventional methods other than PVD methods may be used to apply the layers of Mullin. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the alternating layers of Mullin by other conventional methods, including by CVD and thermal spraying, as Mullin suggests that effective laminates may be achieved by alternative methods.

17. Claims 1, 3-9, 12, 14-19, 22, 24-29, 31, 32, 35-37, 40, and 42-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strondl et al. USPN 6,333,099. Strondl et al. teaches a coated tool implement having a plurality of alternating TiAlN and alumina layers, where the TiAlN layer can be identified with the claimed metal alloy layer and the alumina layer can be identified with the claimed ceramic oxide layer. The individual layer thickness may be 20 nm. The collective thickness may be 6 microns. The layers are deposited by sputtering, while heat treating at 650^{o}C. Strondl also suggests applying layers by CVD. See Strondl (col. 3, line 25 through col. 4, line 56). The above description characterizing Strondl is based on Strondl's discussion of preferred aspects of

Strondl's invention, as opposed to based on specific examples. To the extent that Stondl's description is only a suggestion, as opposed to an exemplifying teaching, it would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate the articles incorporating Strondl's preferred aspects, as Strondl suggests that articles incorporating such preferred aspects will possess favorable wear resistance. Strondl suggests that effective articles may be formed by CVD. It would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate the articles of Strondl by CVD as Strondl suggests that effective articles may be made in this manner.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael La Villa whose telephone number is (571) 272-1539. The examiner can normally be reached on Monday through Friday.

19. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

20. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael La Villa
9 December 2005

MICHAEL E. LAVILLA PH.D.
PRIMARY EXAMINER